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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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08/825,360

03/28/1997

MARVIN LIAO

761/PTUS/CVD

9780

32588

7590

08/13/2002

APPLIED MATERIALS, INC.
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SANTA CLARA, CA 95050

EXAMINER

QUACH, TUAN N

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 08/13/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/825,360

Applicant(s)

LIAO ET AL.

Examiner

Tuan Quach

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 May 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-23 and 25-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-23 and 25-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 August 1998 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 21-23, 25-45, and 48-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bai et al. in view of Ho et al., Hower et al., and Fu et al. of record. See the reasons of record delineated in Paper No. 27, page 3 line 18 through page 4 line 5 (the sentence between lines 5-10 being unnecessary as the feature has been deleted from claims 21 and 48), line 10 through page 6, line 2.

Claims 46 and 47 rejected under 35 U.S.C. 103(a) as being unpatentable over Bai et al. in view of Ho et al., Hower et al., and Fu et al., as applied to claims 21-23, ~~24~~ 45, and 48-53 above, and further in view of Dixit et al. of record. See the reasons of record delineated in Paper No. 27, page 6 lines 6-13.

Claims 21-23 and 25-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dixit et al. or Sandhu et al. taken with Suguro et al. and further in view of Ho et al., Hower et al., and Fu et al. of record.

See the reasons of record, Paper No. 27, page 6 line 17 through page 8.

Applicant's arguments filed May 29, 2002 have been fully considered but they are not persuasive.

Initially, regarding the rejection under 35 U.S.C. 112, the rejection has been withdrawn in view of the deletion of the limitation regarding the metal nitride being of greater thickness of the refractory material.

Regarding the 131 declaration filed October 20, 1999, the declaration is deficient since it is unsigned by all the inventors; the signatures of Marvin Liao on page 2, Chi S. Chern, Michal Danek, and Ivo Raaijmakers on page 3 are missing and there is no showing as delineated in MPEP 715.04; particularly 715-05(B)-(D).

The response provided in Paper No. 23 page 7-10 regarding the declaration and the prior art remains applicable as applicant has not responded thereto and is incorporated herein by reference. Particularly, the declaration and accompanying exhibit does not clearly explain which facts applicant is relying upon to show completion of the invention prior to the effective reference date. It cannot be determined what exhibit A constitutes, whether it is the entire report, or the Table of Contents or which page or which portion of exhibit A is being relied upon. Section 4.8.2 of exhibit A (page 27) describes data for 50 Å and 100Å TiN films deposited upon 300Å titanium on silicon substrates, Figs. 25 and 26, pp. 28-29. There is no showing which facts are being

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relied upon to show completion of the invention. Applicant argues that it is not necessary to show the plasma annealing since Bai et al. do not show such annealing. Nonetheless, this argument ignores the basic feature regarding plasma annealing in the claimed invention. To the extent that the basic invention here is regarding the thickness of metal nitride then in that regard, applicant's invention would be same patentable invention since it would have been obvious over Bai et al., since the plasma annealing would correspond to a well known and obvious difference as opposed to a patentable difference with respect to Bai et al. See MPEP 715.05. It follows that to that extent, the filing of the 131 declaration is inappropriate to overcome the Bai et al. reference, MPEP §2306 and the patent can be overcome by establishing priority of invention through interference proceedings, MPEP Chapter 2300. In any event, the plasma annealing would have been conventional and obvious as amply shown by the prior art of record, e.g., Ho et al., Hower et al., and Fu et al. It remains that the incorporation of such well known plasma annealing in Bai et al. would have been obvious to one skilled in the art. Additionally, applicant further fails to consider the teachings of Suguro et al. wherein the optimization of TiN thickness is taught, including the use of TiN thickness of 4 nm, 7 nm, and 10 nm.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner